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**INTERNATIONAL PRELIMINARY  
REPORT ON PATENTABILITY  
(SEPARATE SHEET)**

International application No.

AP3 Rec'd PCT/PTO

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PCT/FI2004/000778

**Re Item V**

**Reasoned statement with regard to novelty, inventive step or industrial applicability;  
citations and explanations supporting such statement**

**1. Subject-matter**

Subject-matter of claim 1 of the present application is a process for producing two different polymer grades having different isotacticity while keeping the melt flow rate constant during the transition.

The process is carried out in at least one reactor in the presence of hydrogen using a Ziegler-Natta catalyst system comprising an external electron donor, which is changed during the transition.

The electron donor is a silicon compound.

Subject-matter of claim 10 is a process for the preparation of at least two propylene polymers having different isotacticity but the same melt flow rate, using a catalyst system comprising a first and a second external donor.

Subject-matter of dependent claim 19 is a process, wherein the catalyst component is prepared according to a liquid-liquid two phase emulsion method comprising:  
preparing a solution of a group 2 metal (Mg) and an electron donor in an organic liquid,  
reacting said complex in solution with a transition metal compound to form a dispersion,  
maintaining droplets of said dispersed phase within an average size of 5 to 200  $\mu\text{m}$  by agitation.

The disperse phase is an oil less dense than the dispersed phase.

The problem to be solved was to provide a process which allows changing the isotacticity of a propylene polymer by changing of the external donor, while keeping the melt flow rate and thus the hydrogen flow constant.

This problem can be solved by using special catalysts, obtained from a liquid-liquid two phase emulsion method, which are self supporting and which show no difference in hydrogen dependent on the used external donor.

**2. Prior Art**

Reference is made to the following documents:

D1: WO 99/20663

D2: WO 95/21203

D3: WO 03/059966

D4: WO 03/000754

D5: WO 03/000757

**D1** discloses a process for forming a high impact propylene copolymer wherein sequentially different external electron donors having a different hydrogen response and a different stereo regulating properties are used. The problem of different hydrogen response and the effect on the melt flow rate is discussed.

**D2** discloses a catalyst system which includes a titanium-supported catalyst in combination with a mixture of tetraethoxysilane (TEOS) and dicyclopentyldimethoxy-silane (DCPMS) as external electron donors. These two external donors lead to different melt flow rates. Therefore, the catalyst system has been found to be effective in making polypropylene and polypropylene copolymers having relatively high melt flow rates and moderately broad molecular weight distribution.

In one embodiment a two step process is disclosed wherein in the first step a propylene polymer is prepared having a melt flow rate of 10 - 1200 dg/min and in the second step a polymer is prepared having a melt flow rate of 1 - 120 dg/min.

Nothing is disclosed about a process for the production of polypropylene having different isotacticity but the same melt flow rate, at a constant hydrogen concentration.

**D3** also relates to a process using different external electron donors, which are added to the polymerization system at different positions. It is disclosed that the different electron donors have a different hydrogen response and that this hydrogen response and the stereo regulating capability of a given electron donor are directly and inversely related. This is in contrast to the teaching of the present invention, wherein specially prepared Ziegler-Natta catalysts are used, which show a different behaviour.

**D4 and D5**, both cited by the application, disclose the preparation of the special Ziegler-Natta catalyst, used in the present invention.

### **3. Novelty (Article 33(2) PCT)**

It appears that the subject-matter of present **claims 1 - 35** lacks novelty in view of **D1**.

**4. Inventive Step (Article 33(3) PCT)**

Since it appears that the subject-matter of the present claims lacks novelty, an inventive step can not be acknowledged, too.

**5. Industrial applicability (Article 33(4) PCT)**

The claimed process is suitable to adjust the properties of propylene polymers. Since propylene polymers having special properties are very important industrial products, industrial applicability can be acknowledged.

**Re Item VII**

**Certain defects in the international application**

Contrary to the requirements of Rule 5.1(a)(ii) PCT, the relevant background art disclosed in the document WO 95/21203 is not mentioned in the description, nor is this document identified therein.

**Re Item VIII**

**Certain observations on the international application**

1. The application does not meet the requirements of Article 6 PCT because it is not clear.

Although claims 1, 10 and 31 have been drafted as separate independent claims, they appear to relate effectively to the same subject-matter and to differ from each other only with regard to the definition of the subject-matter for which protection is sought and in respect of the terminology used for the features of that subject-matter. The aforementioned claims therefore lack conciseness and as such do not meet the requirements of Article 6 PCT.

The applicant is requested to file one independent process claim in accordance with Rule 6.3 PCT, containing all essential technical features.

Preferred embodiments of the claimed process can be described in dependent claims.

2. The application does not meet the requirements of Article 6 PCT, because claim 1 is not clear.

The wording "comprising a catalyst component and an external donor, wherein the external donor is changed" is not clear from the claim.

It appears from the context that the first external donor is exchanged for a second external donor.

This, however, is not clear from the claim.

3. The application does not meet the requirements of Article 6 PCT, because **claim 2** is not clear.

The relative term "strongly coordinating" used in claim 2 has no well-recognised meaning and leaves the reader in doubt as to the meaning of the technical features to which it refers, thereby rendering the definition of the subject-matter of said claims unclear.

4. The application does not meet the requirements of Article 6 PCT, because **claims 1, 3, 8, 10, 16, 26 and 32** are not clear.

The expressions "preferably", "optionally" and "in particular" render the scope of the claims unclear.

The preferred technical features have to be made subject-matter of further dependent claims.

5. The application does not meet the requirements of Article 6 PCT, because **claims 4 and 13** are not clear.

It appears from the context of the present application that a first external donor is exchanged for a second. Present claims 4 and 13 try to define the electron donor but do not specify which of the two electron donors, the first, the second or both is meant.

6. The application does not meet the requirements of Article 6 PCT, because **claims 7 and 11** are not clear.

Subject-matter of dependent claims 7 and 11 is a process comprising forming a liquid-liquid emulsion system and solidifying the dispersed droplets.

The subject of claims 7 and 11 as a whole is so unclear that there is no hint to the skilled reader, which kinds of liquids have to be chosen and in which amounts. Moreover it is not clear what is meant by "solidifying" in this context.

7. The application does not meet the requirements of Article 6 PCT, because

**claims 9 and 10** are not clear.

The relative terms "essentially" and "essentially constant" used in claims 9 and 10 have no well-recognised meaning and leave the reader in doubt as to the meaning of the technical feature to which they refer, thereby rendering the definition of the subject matter of said claim unclear.

8. The application does not meet the requirements of Article 6 PCT, because **claim 15** is not clear.

The expression "predetermined size range" is unclear since no size range has been defined.

9. The application does not meet the requirements of Article 6 PCT, because **claim 23** is not clear.

Claim 23 relates to a process wherein said emulsion is composed of a dispersed phase which is  $\text{TiCl}_4$ /toluene insoluble oil, having a Group 4 metal/Mg mol ratio..."

It is assumed that said Group 4 metal is said  $\text{TiCl}_4$ .

Therefore, "Group 4 metal" has to be replaced by Titanium.

Moreover, it can not be understood from the claim what kind of oil could be meant by "toluene insoluble oil".